UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/972,203	10/09/2001	Timothy E. Bishop	P 283694 D1056-CIP	3568

43569 7590 07/28/2006

MAYER, BROWN, ROWE & MAW LLP
1909 K STREET, N.W.
WASHINGTON, DC 20006

EXAMINER	
MCCLENDON, SANZA L	
ART UNIT	**PAPER NUMBER**
1711	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/972,203	BISHOP ET AL.	
	Examiner	Art Unit	
	Sanza L. McClendon	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-5,7-22 and 24-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5,21,22,24-29 and 59* is/are allowed.

6)☒ Claim(s) *2-4,7-20,30-58 and 60-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the Amendment received on April 13, 2006, the examiner has carefully considered the amendments. The Delcaration under 37 CFR 1.132 filed April 13, 2006 is insufficient to overcome the rejection of claims 2-4m 7-20, 21, 30-58 and 60-62 based upon the prior art rejections as set forth in the last Office action (mailed 12/13/2005) because: the method of curing and method of testing are not disclosed in the declaration. It is not clear if both were irradiated for the same amount of time, tested by the same method (such as by FTIR or others).

Additionally, it appears that the declaration is not commensurate in scope with the claims (16 and 17). Claim 16 calls for three non-specified photoinitiators while the declaration has three specific photoinitiators. While it appears the declaration data shows a larger degree of cure for the specific photoinitiator package, it is not clear that any other combinations of the disclosed photoinitiators in applicant's disclosure will provide the same outcome/properties.

Applicant appears to be relying on the data to show that "cure speed" is increased when replacing 1-hydroxyl-cyclohexyl-phenyl-ketone is replaced in a comparative composition with at least three photoinitiators (see declaration for the specific photoinitiators), however the examiner is not convinced that the **cure speed** is increased. The examiner can see how the "**degree of cure**" has increased. But the examiner fails to see how the term "faster" in the claims correlated to "degree of cure, especially when "faster" implies some sort of time associated with it. WO 98/50317, from

applicant's PTO-1449, teaches that "cure speed" is used to represent the radiation dosage which provides a cross-link density such that the MEK value is a predetermined set number of rubs at a thickness of 20 microns". While teaching the %RAU represents the "degree of cure". So in the examiner's opinion the declaration fails to show a "faster" cure, but rather shows a degree of cure. And in this case, the examiner additionally fails to see where this property would be an unexpected result. It is deemed the "degree of cure" would have been greater for a composition in which one photoinitiator (specially hydroxy-cyclohexyl-phenyl ketone has been replaced with an equal amount of at least three different types of photoinitiators, since there would be different kinds of reactive radicals produced (more than likely dissimilar radicals) upon exposure to radiation, each, more than likely, having different initiation efficiencies, which would more than likely account for a larger degree of cure.

Does there not have to be some sort of "time" associated with applicant's declaration to obtained how "fast" and/or "how rapidly" it took to cure the two identical compositions having the same weight amount of photoinitiators that differ only in that the inventive examples have at least 3 photoinitiators, while the comparative examples have only one. The examiner disagrees with applicant's unexpected results for cure speed. At most, in the examiner's opinion, the results show that the degree of cure is higher in the inventive cured composition verses the comparative composition—see above. There is no evidence with regard to speed—for further explanations see below arguments.

Response to Arguments

1. Applicant's arguments filed April 13, 2006 have been fully considered but they are not persuasive. Applicant appears to be relying on comparable data in the disclosure and/or declaration and, additionally, applicant argues "it is important to note that one of ordinary skill in the art understands that one measure of cure speed is a determination of %reacted acrylate unsaturation, with the higher %RAU at low cure dose, i.e. at 4.4 mJ/cm2, indicating a faster cure speed." to overcome the rejection of the claims. Since applicant's unexpected result (declaration) is persuasive and the prior art made of record teaches the combiantion of photoinitiators (althought not by absorbance) are known in photocurable composition and there being no other convincing arguments that it would not have been obvious for an person of ordinary skill level to use a combination of photoinitiators as described in the rejections, the rejections applied in the last Office action still stand. Regarding claims 2-4, 20, 30-58 and 60-62, the examiner deems these are still anticipated by the art rejections because the applied prior art teaches the same photoinitiators as disclosed by the applicant, which have the properties found in the claims. Therefore the examiner deems that the prior art photoinitiators, which can be used in combination with each other as found in the teachings of the prior art, inherently have the claimed properties.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2-4, 7-20, 30-35, 36-58 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snowwhite et al (6,136,880).

Snowwhite et al teaches radiation curable liquid resin compositions for optical fibers. Said liquid resin composition comprises from 10 wt% to 90 wt% of a polyurethane acrylate, from 10wt% to 90wt% of at least one radiation curable monomer diluent and an effective amount of a phosphine oxide photoinitiator having the formula found in the abstract. Said polyurethane acrylate has a molecular weight between 1,000 to about 8,000 Daltons and is the reaction product of an oligomer polyol, a diisocyanate, and a hydroxyl functional ethylenically unsaturated monomer, such as a hydroxyalkyl (meth) acrylate. Said oligomeric polyol is preferably a polyether polyol, such as polytetramethylene glycol—see column 7, lines 10-20 and 50-65. Snowwhite et al teaches, in addition to the preferred polyether polyol, other oligomeric polyols such as polyester, polycarbonate and polyolefin polyols can be used in combination with said polyether polyol. The preferred diisocyanates can be chosen from those listed in column 10, lines 27-31, wherein isophorane, methylene bis (4-cyclohexylisocyanate) and toluene diisocyanate are taught. The reactive diluents can be found in column 12, lines 36 to the end, wherein nonylphenol PO modified acrylate is taught. In addition to the above listed reactive diluents Snowwhite et al teaches that di-functional reactive diluents, such as hexanediol diacrylate can be used. Snowwhite et al teaches in addition to the phosphine oxide photoinitiator of formula (1) other free radical photoinitiators such as those listed in column 16, lines 35 to 55 can be used in combination with said phosphine oxide. In addition other commonly used additive such as silane coupling agents and others listed in column 17, lines 40-45 can be used in said coating composition. Per examples 1, 5, 7, 8, 9, and 14, Snowwhite et al teaches using polytetramethylene glycol in the synthesis of the polyurethane acrylate. Snowwhite et al teaches using combination of photoinitiators. Therefore it would have been obvious to one skilled in the art at the time of the invention to employ combinations of any photoinitiators taught by Snowwhite et al for the following reasons. Snowwhite et al teaches that in addition to the phosphine oxide other free radical photoinitiators can be used in the radiation curable composition. It is well known in the photopolymerization art to use different kinds of photoinitiators to take advantage of different known properties, such as sensitivity to different wavelengths of light. Acylphosphine oxides, for example, are well known for the ability to provide depth of cure or cure in the presence of pigments and for being useful in combination with phenyl

ketone photoinitiators. The motivation for using combination of photoinitiators would have been a reasonable expectation of a faster and more complete cure of said resin compositions in the absence of evidence to the contrary and/or unexpected results. With regard to claim 16, the combination of initiators as taught by Snowwhite et al should inherently cure faster than a comparable composition employing only hydroxy-cyclohexyl-phenyl ketone as a photoinitiator. It is deemed that Snowwhite et al reads on claims 13-16 and 61 because Snowwhite et al teaches a composition that reads on the instant composition therefore the compositions of Snowwhite should have the same percentage reacted acrylate unsaturation when cured at a does of about 4.4 mJ/cm2 in the absence of evidence to the contrary.

Note: This application presents comparable data (specifically example s Ex. D, 10 Ex. E, and 12) to show that the cure rate is improved when a specific combination of photoinitiators employed is used. However claim 16 is not commensurate in scope with the evidence of unexpected results (i.e. example 10 has 4 photoinitiators in an amount of 4.5-wt% and example 12 has four photoinitiators in an amount of 3.0-wt% while the comparative example uses hydroxy-cyclohexylphenyl ketone in amount of 6.0-wt% and 4.0-wt%, respectively) and these all show a % reacted acrylate saturation at a cure speed of 4.4 mJ/cm2 for all. There is not a showing of a faster cure speed but of a more reacted acrylate unsaturation for the compositions.

4. Claims 2-4, 7-20, 30-35, 36-58 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snowwhite et al (6,359,025).

Snowwhite et al teaches radiation curable liquid resin compositions for optical fiber coatings. Snowwhite et al teaches using a radiation curable urethane acrylate oligomer, a radiation curable monomer diluent and an effective amount of photoinitiator represent by formula 1 found in the abstract. Said polyurethane acrylate has a molecular weight between 1,000 to about 8,000 Daltons and is the reaction product of an oligomer polyol, a diisocyanate, and a hydroxyl functional ethylenically unsaturated monomer, such as a hydroxyalkyl (meth) acrylate. Said oligomeric polyol is preferably a polyether polyol, such as polytetramethylene glycol—see column 7, lines 10-20 and 50-65. Snowwhite et al teaches, in addition to the preferred polyether polyol, other oligomeric polyols such as polyester, polycarbonate and polyolefin polyols can be used in combination with said polyether polyol. The preferred diisocyanates can be chosen from those listed in column 10, lines

27-31, wherein isophorane, methylene bis (4-cyclohexylisocyanate) and toluene diisocyanate are taught. The reactive diluents can be found in column 12, lines 36 to the end, wherein nonylphenol PO modified acrylate is taught. In addition to the above listed reactive diluents Snowwhite et al teaches that di-functional reactive diluents, such as hexanediol diacrylate can be used. Snowwhite et al teaches in addition to the phosphine oxide photoinitiator of formula (1) other free radical photoinitiators such as those listed in column 16, lines 35 to 55 can be used in combination with said phosphine oxide. In addition other commonly used additive such as silane coupling agents and others listed in column 17, lines 40-45 can be used in said coating composition. Per examples 1, 5, 7, 8, 9, and 14, Snowwhite et al teaches using polytetramethylene glycol in the synthesis of the polyurethane acrylate. Snowwhite et al teaches using combination of photoinitiators. Therefore it would have been obvious to one skilled in the art at the time of the invention to employ combinations of any photoinitiators taught by Snowwhite et al for the following reasons. Snowwhite et al teaches that in addition to the phosphine oxide other free radical photoinitiators can be used in the radiation curable composition. It is well known in the photopolymerization art to use different kinds of photoinitiators to take advantage of different known properties, such as sensitivity to different wavelengths of light. Acylphosphine oxides, for example, are well known for the ability to provide depth of cure or cure in the presence of pigments and for being useful in combination with phenyl ketone photoinitiators. The motivation for using combination of photoinitiators would have been a reasonable expectation of a faster and more complete cure of said resin compositions in the absence of evidence to the contrary and/or unexpected results. With regard to claim 16, the combination of initiators as taught by Snowwhite et al should inherently cure faster than a comparable composition employing only hydroxy-cyclohexyl-phenyl ketone as a photoinitiator. It is deemed that Snowwhite et al reads on claims 13-16 and 61 because Snowwhite et al teaches a composition that reads on the instant composition therefore the compositions of Snowwhite should have the same percentage reacted acrylate unsaturation when cured at a does of about 4.4 mJ/cm2 in the absence of evidence to the contrary. See additional note in above rejection.

5. Claims 2-4, 7-20, 30-35, 36-58 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al (6,057,034).

Yamazaki et al teaches compositions for coating optical fibers comprising a combination of photoinitiators. Per the examples Yamazaki et al teaches reacting polytetramethylene glycol with diisocyanates such as hexamethylene diisocyanate, isophorane diisocyanate and toluene diisocyanate and with a hydroxy alkyl acrylate to obtain a polyurethane acrylate, which anticipates claims 1, 8, and 18-19 and having a molecular weight that read on those found in the claims. The photoinitiators disclosed by applicant, including phenyl ketones, acylphosphine oxide, and oligomeric photoinitiator, re disclosed by Yamazaki et al. See columns 9-10 and the examples, wherein Yamazaki et al specifically mentions commercial combination of photoinitiators in column 10, lines 9-12. Thus it would have been obvious to a skilled artisan at the time of the invention to use combination of any of the photoinitiators taught by Yamazaki et al for the following reasons. Yamazaki et al teaches that of photoinitiators disclosed is useful in the disclosed compositions, the photoinitiators can be used in combination and use of combination of photoinitiators in the examples. It is well known in the photopolymerization art to use different kinds of photoinitiators to take advantage of different known properties, such as sensitivity to different wavelengths of light. Acylphosphine oxides, for example, are well known for the ability to provide depth of cure or cure in the presence of pigments and for being useful in combination with phenyl ketone photoinitiators. The motivation for using combination of photoinitiators would have been a reasonable expectation of a faster and more complete cure of said resin compositions in the absence of evidence to the contrary and/or unexpected results. It is deemed that Yamazaki et al reads on claims 13-16 and 61 because Yamazaki et al teaches a composition that reads on the instant composition therefore the compositions of Yamazaki et al should have the same percentage reacted acrylate unsaturation when cured at a does of about 4.4 mJ/cm2 in the absence of evidence to the contrary.

6. Claims 2-4, 7-20, 30-35, 36-58 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moschovis et al (4,782,129).

Moschovis et al teaches buffer coating compositions for optical fibers. Said composition comprises an acrylated-capped polyurethane in admixture with a monoethylenically unsaturated monomer. Said polyurethane is the reaction

product of an organic diisocyanate with a modified diol and a hydroxyalkyl acrylate. Said modified diol is the diester reaction product of polyoxytetrmethylene glycol with a long chain ester forming hydrocarbon-substituted dicarboxylic acid or a ester forming substitution product thereof. The dicarboxylic acid can be succinic acid or adipic acid. The organic diisocyanate can be a toluene diisocyanate, isophorane diisocyanate, and a dimer fatty acid diisocyanate and, as seen in the examples, saturated methylene diphenyl diisocyanate, wherein some are deemed to read on those found in the claims. In addition to the modified diol, other diols, such as 1,6-hexane diol and trimethylolpropane in amounts up to 10% of the total amount of difunctional reactants in the polyurethane, can be used for making the polyurethane. It is deemed that applicant's component proportions are read by the general disclosure as taught by Moschovis in the absence of arguments to the contrary. Per examples, Moschovis et al teaches using a silane-coupling agent (e.g., methacrylate ester of gamma hydroxylpropyl trimethoxy silane). Moschovis et al teaches using photoinitiators as a component in said compositions. Moschovis et al teaches using photoinitiator combination of Irgacure 907 with isopropylthioxanthone, in addition also phosphine oxides and hydroxylcyclohexyl phenyl ketone are also useful. Moschovis et al teaches that said photoinitiators could be used alone or in admixture with one another. Thus it would have been obvious to a skilled artisan at the time of the invention to use combination of any of the photoinitiators taught by Moschovis et al for the following reasons. Moschovis et al teaches that of photoinitiators disclosed is useful in the disclosed compositions, the photoinitiators can be used in combination and use of combination of photoinitiators in the examples. It is well known in the photopolymerization art to use different kinds of photoinitiators to take advantage of different known properties, such as sensitivity to different wavelengths of light. Acylphosphine oxides, for example, are well known for the ability to provide depth of cure or cure in the presence of pigments and for being useful in combination with phenyl ketone photoinitiators. The motivation for using combination of photoinitiators would have been a reasonable expectation of a faster and more complete cure of said resin compositions in the absence of evidence to the contrary and/or unexpected results. It is deemed that Moschovis et al reads on claims 13-16 and 61 because Moschovis et al teaches a composition that reads on the instant composition therefore the compositions

of Moschovis et al should have the same percentage reacted acrylate unsaturation when cured at a does of about 4.4 mJ/cm2 in the absence of evidence to the contrary.

Allowable Subject Matter

7. Claims 5, 21-22, 24-29 and 59 are allowed.

8. The following is an examiner's statement of reasons for allowance: The primary reasons for allowance is the radiation curable oligomer comprising from 10-30 wt% of isophorane diisocyanate, 5-15 wt% of dicyclohexylemthane diisocyanate, 45-75 wt% of polytetramethylene glycol and 5-20 wt% of hydroxyethylacrylate as seen in instant claim 5, which when cured at a dose of about 4.4 mJ/cm2 has a percentage reacted acrylate unsaturation of at least 60%, as can be seen in instant claim 21 in addition to the other instantly claimed components. Additionally, the radiation curable oligomer comprising from 25-35 wt% of isophorane diisocyanate and/or dicyclohexylemthane diisocyanate, 25-40 wt% of polytetramethylene glycol and 15-30 wt% of hydroxyethylacrylate as seen in instant claim 25 in addition to the other components (b) - (c), which when cured at a dose of about 4.4 mJ/cm2 has a %RAU of at least 60%.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sanza L. McClendon whose telephone number is (571) 272-1074. The examiner can normally be reached on Monday through Friday 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sanza L McClendon
Examiner
Art Unit 1711

SMc